Overview of the MSX Principal Investigator Teams

The Midcourse Space Experiment addresses many Ballistic Missile Defense Organization (BMDO) systems issues concerned with surveillance, acquisition, tracking, and target discrimination using infrared, visible, and ultraviolet passive sensors. Unique within BMDO is the MSX organization, with scientific and technical teams assigned to eight major functional areas.

Each team is led by a Principal Investigator, who also serves on an executive team under the guidance of a Chief Scientist. These experts develop plans for data collection and analysis to satisfy requirements defined in two documents: the Systems-Derived Requirements Document (SRD), formally validated by BMDO system elements, and the Science Modeling Requirements Document (SMRD), based on engineering and physics issues independent of point designs.

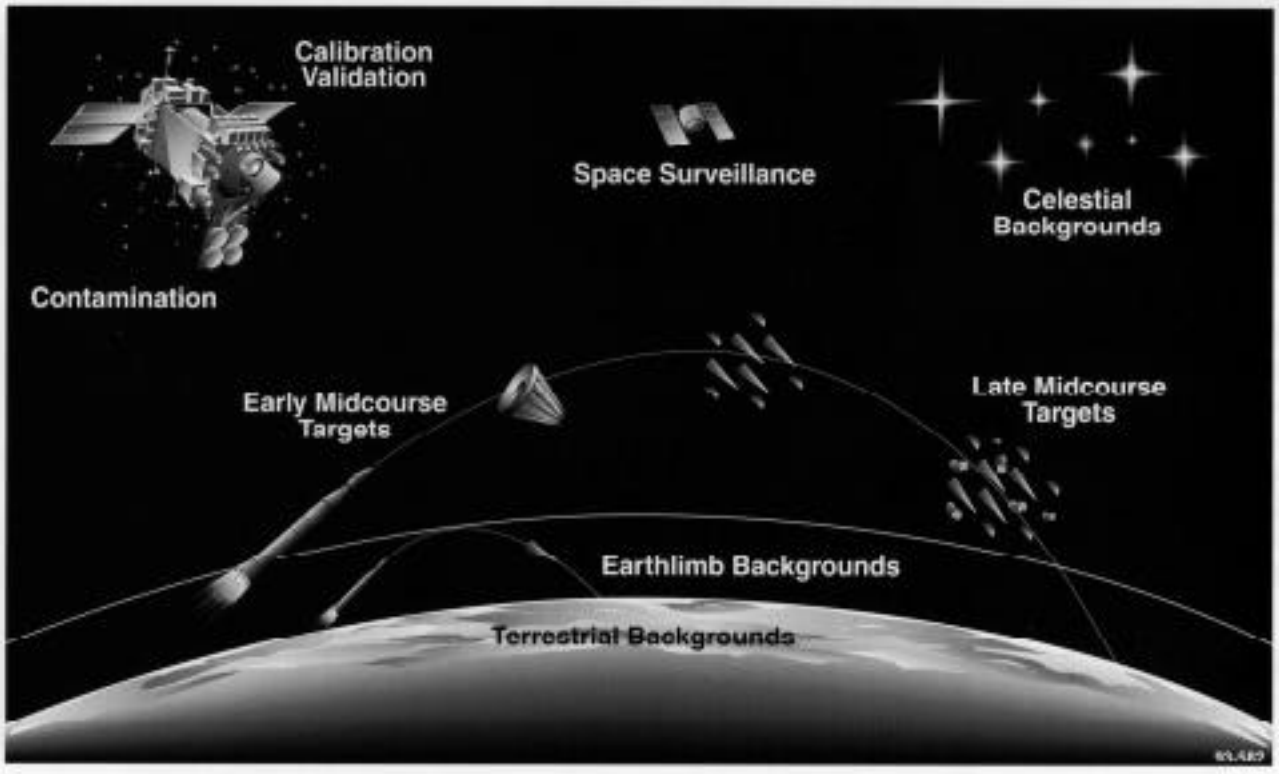
Three distinct categories are supported within the eight functional areas: Targets, Backgrounds, and Enabling Technologies.

Targets

- Early Midcourse Targets addresses issues of warm hardbody (missile) acquisition against hard-Earth, high-altitude plume signatures, and deployment of multiple targets and pen-aids from a post-boost vehicle. Experiments include some 50 objects deployed by two dedicated target missions.

- Late Midcourse Targets concentrates on discrimination by radiometric and dynamic techniques. Experiments include two dedicated ICBM missions with near-term threat objects, bulk filtering for debris, tumbling bodies, and simple pen-aids.

- Space Surveillance focuses on resident space objects, demonstration of search techniques, and value-added of space-based surveillance for new foreign launches. Near-real-time command and con-



trol will be a direct technology transfer.

Backgrounds

• Earthlimb Backgrounds focuses on infrared earthlimb backgrounds, Earth viewing for spatial clutter in two 4.3-μm bands, stratospheric spectral measurements, and thermospheric (60- to 200-km) spatial and temporal clutter in the 6- to 28-μm region. Auroral measurements using the unique UV/VIS/IR/VLWIR simultaneous spectral and spatial capability will permit photochemical extrapolations to nuclear-induced backgrounds.

• Shortwave Terrestrial Backgrounds will focus on characterizing the sunlit, below-the-horizon clutter in the "solar blind" ultraviolet region (~200 to 300 nm) for potential future surveillance applications. Full spectral, spatial, and temporal measurements of the limb airglow and aurora from 110 to 900 nm will be accomplished over the five-year mission life using the UVISI complement of sensors.

• Celestial Backgrounds will use MSX's unique ability to make clutter measurements of zodiacal and other diffuse backgrounds. Point source (stellar) data at 30 times IRAS resolution for catalog subtraction and accurate autonomous pointing will be obtained.

Enabling Technologies

• Contamination is responsible for controlling and monitoring the spacecraft environment and effects on instrument performance through material selection, pre-launch controls, and on-orbit measurements with gaseous and particulate sensors.

• Data Certification and Technology Transfer has three major functions: responsibility for the certification of the Virtual Level 2 data base and the procedures to convert time-ordered data into calibrated scientific units, ground and space calibration and instrument performance validation; and technology transfer to the community.

Science Spinoffs

• Although the primary focus of MSX is in support of the BMDO, there will be numerous science spinoffs in Earth remote sensing, astronomy, orbital debris, upper atmospheric density, and infrared calibration. Examples are discussed on separate fact sheets.

Management

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